

now making rapid advances in the discovery of its virtues is no reason for the neglect of pharmacotherapy, hydrotherapy, mechanotherapy, and electrotherapy in cases in which they will be of benefit.

Re-education is undoubtedly one of the most important factors in producing lasting cures. Nothing is easier among psychoneurotics, perhaps, than to make some symptoms disappear, but the experienced neurologist will not be duped into thinking that he has made a cure by driving away a symptom. In many cases it is only by influencing slowly the mind and body by careful re-education that anything like a real cure can be made.<sup>1</sup>

The methods I have referred to in this paper are, I realize, well known to every member of this Association and are to a greater or less extent practised by all. But the methods are not as widely applied in a conscious way by the profession as a whole as they might well be, and I am wondering if those of us who are teachers direct the attention of medical students to these simple and efficacious methods as frequently as we should.

## ORIGINAL ARTICLES.

### THE VALUE OF A STUDY OF THE APOICAL OUTLINE IN THE DIAGNOSIS OF INCIPIENT PULMONARY TUBERCULOSIS.<sup>2</sup>

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DESPITE the fact that everything that can add to our certainty in making a diagnosis of pulmonary tuberculosis should be welcomed by the profession and used by all men interested in diagnostic work, it is unfortunately true that many measures of undoubted value are neglected, not so much because the profession doubts their utility, as because of that inertia in us all which resists change and holds us to the beaten path, and to some extent because we grudge the extra time necessitated. Thus it is, for example, that the cyrtometer has found so limited a use, simple as is the apparatus and valuable as are the results. It is for the same reasons that the careful outlining of the pulmonary apices has, in this country, been so little used. Taught and practised for years by careful clinicians in Germany, dwelt on by von Ziemssen in his small but classical article "On the Diagnosis of Tuberculosis," and by

<sup>1</sup> L. Levy, P. E. *L'education rationnelle de la volonté; son emploi thérapeutique.* Fifth Edition. Paris, 1905.

<sup>2</sup> Read at the meeting of the American Climatological Association, Atlantic City, N. J., May 14 and 15, 1906.

Kroenig<sup>1</sup> with even more emphasis, in his well-known article, it is yet undeniable that few American practitioners have given it any attention or used it systematically in their routine work.

This paper is written to present my impressions of the diagnostic value of outlining the apices of the lung in pulmonary tuberculosis, based on the marking of such outlines for the past six or more years in all my cases, and with the hope that it may tend to generalize its use among those medical men who pay especial attention to the early diagnosis of pulmonary disease. Since the outlining of the apices is by many called "Kroenig's sign," I would say that it seems to me a regrettable tendency in the literature of our profession to attach to diagnostic methods or symptoms the names of individuals. "The apical outline" is self-explanatory, whereas "Kroenig's sign" is not, aside from the fact that Kroenig, however excellent his work, was not the first to call attention to the subject, though he laid more stress upon it than others.

The pathological fact on which the value of this diagnostic method depends is the well-known tendency to shrinkage of the apex of the lung, and indeed of the lung as a whole, when a tuberculous process develops in it—not alone from fibroid formation with consequent contraction, but even before such fibrosis occurs, through lessened function in the apex. Le Grange<sup>2</sup> has noted that no organ modifies itself so rapidly as does the lung to accommodate itself to the greater or less activity of the demand put upon it, the inactive lung losing greatly in functioning power. Were the shrinkage of the apex caused by fibrosis alone, the diagnostic value of its determination would not be so great, as only when the process has advanced far enough for fibrosis to manifest itself could it be of use; but since the lung decreases in size and functional activity when disused or when disease is developing in it, such shrinkage appears very early and its determination thus becomes a valuable early sign.

Taking up first the technique, I would note that in mapping out the apical lines, great accuracy is desirable, and it is best to use the little finger as a plessimeter. I have not used a plessimeter other than the finger. The percussion stroke here, more than in any other percussion, needs to be very carefully and correctly made, the most vertical elastic stroke possible, generally very lightly made, alone giving accurate results. The patient should sit erect or stand directly facing or backing the examiner, according as we are to mark out the anterior or the posterior outlines; in both cases care must be taken that the head is held exactly in an anteroposterior plane, since if turned to one side or the other the tension of the muscles of the neck is altered and the note affected. In my expe-

<sup>1</sup> Zur topog. der Lungenspitzen, etc., Berl. klin. Woch., 1889, No. 37; 1900, No. 20.

<sup>2</sup> *Médication par l'exercice*, Paris.

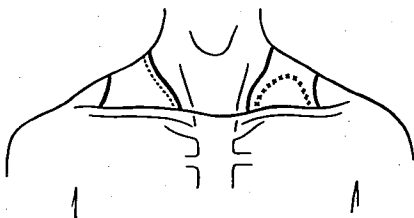
rience the front outlines can be best obtained from the front, except when the supraclavicular fossæ are very deep—which may prevent the proper placing of the plessimeter finger; but cases of doubt should be verified by percussion from behind. Percussion for the inner anterior lines should start well up the side of the neck, above the lung, and comes slowly downward until pulmonary resonance is found, when the inner border of the plessimeter finger should be indicated by a dot of the blue pencil. Repeating this from behind forward we get a series of dots, which we unite with a line. The outer border should be approached from the shoulder and marked off in the same way. In percussing out the posterior lines it is advisable not to have the upper ends of the anterior lines visible, as if they are it will inevitably affect our judgment, while the fact that the upper end of the posterior line coincides accurately at the trapezius bilaterally with the anterior line, when run independently, adds to our assurance of the correctness of our results. The outlines according to Kroenig, as quoted by Fraenkel,<sup>1</sup> are as follows: "The highest level of the apex behind is at the level of the first dorsal spine. Its distance from the midline is 5 to 6 cm. (2 to 2.4 inches) from the highest point. The posterior inner border converges in a line convex to the spinal column to the level of the lower border of the second dorsal vertebra and thence runs downward parallel to and 1 cm. from the spine of the vertebra." The posterior external border is not given by Fraenkel. The anterior external border runs from a little outside the middle of the anterior border of the trapezius rather steeply downward and outward to intersect the clavicle and the junction of its outer and middle one-third. The anterior internal border starts 4 cm. internal to the anterior border on the free edge of the trapezius, and runs from here to the sternoclavicular joint.

My personal experience largely, but not entirely, agrees with these findings. Owing to the very various inclinations of the outline from shoulder to neck, at times very steep, at times much less so, I find the distance at the top between the outer and inner lines varies even in healthy lungs and cannot be safely stated at 5 to 6 cm. Again, I have found the highest level of the apex to lie as often between the first dorsal and the seventh cervical as at the level of the first dorsal. The posterior external line, in my experience, runs from the middle of the length of the spine of the scapula upward and inward with its concavity outward, to a point from one and one-half inches to two and one-half inches from the highest point of the inner line. The anterior inner lines are generally concave inward above and slightly convex inward below, the lower end not being at, but a half-inch external to, the sternoclavicular joint, although the exact determining of this point is not

<sup>1</sup> Path. u. Therap. d. Lungenkrankh. p. 725.

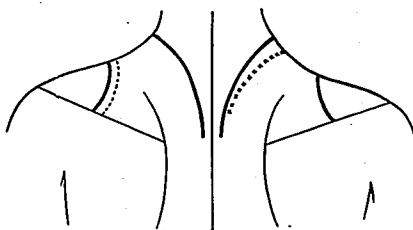
easy, owing to the nearness of the trachea and the large joint. The anterior outer line is steeper than the inner and concave outward, the lower end, as Kroenig notes, ending very regularly at the junction of the outer and middle thirds of the clavicle. I reproduce herewith two diagrams (Figs. 1 and 2), taken accurately from the human body, showing the normal course of these lines. I have marked on them with dotted lines the common variations from the norma in disease.

Fig. 1



— normal outline of the apex; . . . outward dislocation of the inner border; x x x marked shrinkage of both borders (front view).

Fig. 2



— normal outlines of the apex; . . . inward dislocation of the outer border; x x x outward dislocation of the inner border (rear view).

In early tuberculosis, especially of the apex, but also of lower portions of the lung, careful percussion will very generally demonstrate a dislocation of the inner line outward. I have found that the inner line, both anteriorly and posteriorly, is likely to be the earliest affected, which when we remember that incipient lesions are prone to develop toward the inner border of the lung, seems natural. The posterior inner line changes chiefly or only in its upper two-thirds. The dislocation inward of the outer border generally occurs later, and a change of both inner and outer lines is naturally less common than of the inner or outer alone. In early cases the

lines do not approximate at the top, but join their fellows from the rear; in old cases with marked fibroid shrinkage they often run together to an apex before they reach the trapezius border. I have found the diagnostic value of these outlines in earlier cases, and to some extent their prognostic value later, to be considerable, not, of course, when taken alone, for no sign unsupported by others has great value; but in combination with others, such a dislocation occurring in a dubious case, with other signs in themselves not final, may serve to clinch a diagnosis. A slight inward alteration of a border anteriorly and posteriorly carefully verified, will raise to a far higher value ambiguous auscultatory signs. Outward dislocation is, as I have said, neither so early nor quite so easy to determine, but if certainly demonstrated has equal value. Dislocation without marked flattening or hollowing of the supraclavicular fossa would seem to depend on lessening of volume from lessened function, while that accompanied by such hollowing or flattening would point to the existence of fibrosis, though only post-mortem evidence could verify this assumption of mine.

One will often find in a case wherein one apex shows a burnt-out fibroid process and the other an incipient trouble, that the former will give marked dislocation and a hollowed supraclavicular fossa, while the latter will often show little or no hollowing at all, but a slight unilateral or bilateral dislocation. Bilateral dislocation speaks almost certainly for a fairly advanced or an old burnt-out process, and since the signs of an arrested process are often equivocal the determination of such an alteration is of value. Von Ziemssen's assertion that apical shrinkage can be entirely compensated for or obliterated by compensatory emphysema, which according to Fraenkel was denied by Oesterriech, I have found to be true repeatedly, nothing being commoner in an incipient case recovering than to see such dislocations gradually disappear, and at the same time to note a filling out of a flattened fossa and a return to more normal resonance, due to compensatory emphysema. Such shrinkages can also give valuable early warning of involvement of a hitherto unaffected apex. I would say that when, as is so often the case, we find changes in the breath sounds without dulness at a right apex and are in doubt whether to consider them physiological or pathological, we should be especially careful to map out the outline; such breath sounds in a right apex showing shrinkage have a greatly increased diagnostic value.

In drawing a prognosis, also, one can at times derive aid from a study of the apical outline, chiefly from such re-expansions, as I have just dwelt on. When early in a case, before fibrosis can be expected, we find rapid and marked shrinkage, it speaks for a notable effect on the function of the lung and probably a severe process. Again, it can aid us in giving proof of active fibrosis, when, as I have said, the dislocation is accompanied by marked slowly advancing hollowing of the supraclavicular fossa.